# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 1	Project Typ NAEMS: D Emissions		Status	Completed	Estimated Completion Date	June	2009
Project Name	j						
	missions M		tudy (NAEM	S): Air Emissions	from California		
Project Desci	ription						
estimation of methods/prod	emission ra cedures fror a commerc	ates, promot n livestock	te a national operations.Ir	rations and compi consensus for en ncludes monitorin n Fourier transfori	nissions-estimat g of VOCs and 0	tion	
PI 1		Affiliation F	PI 1	Fund Source 1		Am	ount 1
F. Mitloehner		UC Davis		Ag Air Research (AARC)	Council	\$2	250,000
PI 2		Affiliation F	PI 2	Fund Source 2		Am	ount 2
PI 3		Affiliation F	PI 3	Fund Source 3		Am	ount 3
Report Local			- it - wise - /t l-	de en letre l			
http://www.e	pa.gov/airqi	Jailly/agmor	moring/tech	docs.ntmi			
Related info	1						
Related info	2						

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	roject Type Pairy Emissions	Status	Completed	Estimated Completion	May 2009
	•			Date	
Project Name					
	nissions Monitoring St (NAEMS CA5B)	tudy (NAEMS)	: Air Emissions	from California	
Project Descrip					
estimation of ei methods/proce	ess emissions from livesion rates, promote dures from livestock of commercial dairy using the commerci	te a national co	onsensus for em udes monitoring	nissions-estimat g of VOCs and 0	ion
PI 1	Affiliation F	PI 1 F	und Source 1		Amount 1
F. Mitloehner	UC Davis		IRB		\$40,000
PI 2	Affiliation P	PI 2	und Source 2		Amount 2
Y. Zhao	UC Davis				
PI 3	Affiliation F	P13	und Source 3		Amount 3
Report Location	on				
http://www.epa	a.gov/airquality/agmor	nitoring/techdo	cs.html		
Related info 1					
Related info 2					
Please pro	vide project undates :	and corrections	s to:		

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 3	Project Typ NAEMS: D Emissions		Status	Completed	Estimated Completion Date	May 2	009				
Project Name	e										
		Ionitorina S	tudy (NAEM	S): Air Emissions	from California						
	National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies from California Dairies, Part III (NAEMS CA5B)										
Project Desc	ription										
Project Description  Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations.Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer											
PI 1		Affiliation F	PI 1	Fund Source 1		Amo	ount 1				
F. Mitloehner		UC Davis		CDFA			570,000				
r. Milloerinei		OG Bavis		OBIA		<u> </u>	77 0,000				
PI 2		Affiliation F	912	Fund Source 2		Amo	ount 2				
Y. Zhao		UC Davis									
PI 3		Affiliation F	213	Fund Source 3		Amo	ount 3				
Report Loca	tion										
http://www.epa.gov/airquality/agmonitoring/techdocs.html											
Related info	) 1										
Related info	2										

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

4	<mark>Project Typ</mark> NAEMS: D Emissions		Status	Completed	Estimated Completion Date	June	2012
Project Name							
	missions M	Ionitoring S	tudy (NAEMS	S): Air Emissions f	from California		
Dairies, Part I\	/ (NAEMS	CA5B)	• ,	,			
Project Descrip	ption						
				ations and compil			
				consensus for em			
				cludes monitoring		3HG	
		ial dairy usii	ng open-path	Fourier transforn	n infrared (OP-		
FTIR) analyze	r						
DI 4		Affiliation F	01.4	Fund Source 1		Λm	ount 1
PI 1 F. Mitloehner		UC Davis	11	UC Davis, Colleg	o of Ag and		\$40,000
F. Mittioenner		OC Davis		Env'al Sciences	e of Ag and	, I	φ40,000
PI 2		Affiliation F	טו ס	Fund Source 2		۸m	ount 2
Y. Zhao		UC Davis	12	runa Source 2		AIII	Ourit 2
r. Znao		OC Davis				Ì	
PI 3		Affiliation F	13	Fund Source 3		Am	ount 3
Deport Least							
Report Location	On						
http://www.ep	a.gov/airgi	ualitv/agmor	nitorina/techo	locs.html			
	3	, , , , , , , , , , , , , , , , , , ,	<b>J</b>				
Related info	1						
rtolatoa lillo							
	•						
Related info	2						-

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	May 2010
5	Dairy Emissions			Completion	
				Date	
				\ <u></u>	-
Project Name		<del></del>	· · · · · · ·		
	ed Farm Emission Mod	del to Estimate	Air Emissions f	rom California	
Dairies, cont	ract 05-344				
Project Desc	ription				
	cal principles and engi	neering studies	s, develop a feed	d/waste stream	
process-base	ed dairy farm emission	model for VO	C emissions.		
	A COLL C		- 10 1		
PI 1	Affiliation		Fund Source 1		Amount 1
R. Zhang	UC Davis		ARB		\$299,191
PI 2	Affiliation		Fund Source 2		Amount 2
F. Mitloehnei	UC Davis		JC Davis		
PI 3	Affiliation		Fund Source 3		Amount 3
A. Goldstein	UC Berke	ley	JC Berkeley		
Report Loca	tion				
http://www.a	rb.ca.gov/research/ap	r/past/05-344.p	odf		
Related info	n 1				
related line	, 1				
Polated info	. ?				
Related info	) <u>C</u>				
L					
	rovide project updates				
	encer, Planning and To	ecnnical Suppo	ort Division		
Jspencer	@arb.ca.gov				

916.324.2717

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	January 2007
6	Dairy Emissions			Completion	
				Date	

### Project Name

Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California

### Project Description

Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project ID 55.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$208,000
PI 2	Affiliation PI 2 CSU Fresno	Fund Source 2	Amount 2
D. Goorahoo		ARB	\$104,000
PI 3	Affiliation PI 3 CSU Fresno	Fund Source 3	Amount 3
B. Goodrich		SJVAPCD	\$104,000

#### Report Location

http://www.nrcs.usda.gov/Internet/FSE\_DOCUMENTS/nrcs143\_008799.pdf

#### Related info 1

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

### Related info 2

http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo\_pres.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	December 2008
7	Dairy Emissions		-	Completion	
				Date	

### Project Name

Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers

#### **Project Description**

Develop real-time methods for evaluating process and time specific emission profiles for NH3, CH4, and H2S at dairies. A program to monitor ammonia emissions using the USEPA Emission Isolation Flux Chamber began in 2006 and continued through 2008. [No updates since 2006.]

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Goorahoo	CSU Fresno	CSU Agricultural Research Initiative	\$98,000
PI 2 C. Krauter	Affiliation PI 2 CSU Fresno	Fund Source 2 ARB	Amount 2
PI 3 B. Goodrich	Affiliation PI 3 CSU Fresno	Fund Source 3 Boreal Laser	Amount 3

#### Report Location

http://www.deq.state.or.us/aq/dairy/docs/appendix/appendix\_F.pdf

### Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

### Related info 2

Abstract on page 9 at this site:

http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status Complete	d Estimated	May 2009
8 Dairy Emissions		Completion	
Mitigation		Date	

### Project Name

Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley (Contract No. 04-343)

#### **Project Description**

Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	o ARB	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	possible matching funds - CSUS Fresno Agricultural	\$250,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

### Report Location

Report - http://www.arb.ca.gov/research/apr/past/04-343.pdf; Abstract http://www.arb.ca.gov/research/abstracts/04-343.htm

#### Related info 1

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

### Related info 2

Continuation of previous work

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project ID	Project Type	Status	Completed	Estimated	December 2006
	9	Dairy Emissions			Completion	
ı		Mitigation			Date	

#### Project Name

Air Emission Mitigation Techniques and Technologies for California Dairies

#### **Project Description**

Evaluate dairy PM10, 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 Merced County via SWRCB and UC matching	Amount 1 \$600,000
PI 2 R. Zhang	Affiliation PI 2 UC Davis	Fund Source 2	Amount 2
PI 3 P. Robinson	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

### Report Location

http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

#### Related info 1

Project objective described in PowerPoint at:

ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf

### Related info 2

SJVAPCD Aug. 2005 VOC Emission Factors for Dairies, http://www.4cleanair.org/Documents/APCODetermination.pdf

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Estimated	June 2005
10 Dairy VOC Emissions			Completion	
			Date	

#### Project Name

Volatile Organic Compound (VOC) Emissions from Cows Fed Typical California Rations

#### **Project Description**

Measurements of alcohols, volatile fatty acids, phenols, and methane (CH4) emitted from nonlactating (dry) and lactating dairy cows and their manure under controlled conditions. The experiment was conducted in an environmental chamber that simulates commercial concrete-floored freestall cow housing conditions. The fluxes of methanol, ethanol, and CH4 were measured from cows and/or their fresh manure.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
B. Flocchini	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Robinson	UC Davis		

### Report Location

Not Available

#### Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

### Related info 2

UCD Dairy Air Quality Symposium presentation 10-11-06 available at: http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

# California Air Resources Board **Emission Inventory Branch**

	et Type Emissions	Status	Completed	Estimated Completion	June 2007
Mitiga				Date	
roject Name					
ffects of Liquid Da	iry Manure Aeration	on Air Qua	llity and Nutrien	t Cycling	
Project Description					
	luate the air and wa				ater
	y for California dairi				
erobic treatment syssociated with mar	ystems can cost-effe	scuvely red	uce environmer	nai iiripacis	
SSSSIALOG WILLI IIIGI	iaio siorago.				
PI 1	Affiliation PI 1		und Source 1		Amount 1
C. Collar	UCCE - Kings County		JC ANR		\$30,000
12	Affiliation PI 2	F	und Source 2		Amount 2
. Mitloehner	UC Davis				
13	Affiliation PI 3	F	und Source 3		Amount 3
. McGarvey	USDA - ARS		JCCE		
Report Location					
Paper is presented	in the book, "Dairy l	Manure Ma	nagement: Tre	atment, Handlin	g, and
Community Relatio	ns". Available for \$4	.2 at:	· ·		<b>0</b> 7
	g/nra_order.taf?_fu	nction=deta	ail≺_id=48&_l	JserReference=	8429860989D7
67704899E01F					
Related info 1					

Please provide project updates and corrections to: Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

Related info 2

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	2006
12	Dairy Waste			Completion Date	
Project Name					
	tion of Dairy Waste M	lanagement Str	ategies with Reg	ard to Pathoger	ıs
and Air Quali	ity				
Project Desc					
	effect that aerobic an	id anaerobic tre	atments have or	n the microbiolog	jical
and chemica	I properties of waste.				
DI 4	V (t;1; ° 1; ° 1.	DI 4	Fund Course 4		Amount 1
<mark>PI 1</mark> F. Mitloehner	Affiliation UC Davis		Fund Source 1 USDA - ARS		Amount 1 \$30,300
r. Milloenner	OC Davis	3	OODA - AINO		ψ30,300
PI 2	Affiliation	DI 2	Fund Source 2		Amount 2
R. Zhang	UC Davis		runa Source 2		Amount 2
rti <u>Lilari</u> g	o ban				
PI 3	Affiliation	PI3	Fund Source 3		Amount 3
	, timetion		. and Goding o		7 HITOGITE O
Report Loca	tion				
Abstract av		/nublications/nu	hliaatiana htm 20	SEO NO 115 1	05244
nttp://www.a	rs.usda.gov/research	/publications/pu	iblications.ntm?	SEQ_NO_115=1	95211
Related info	0.1				
Related info	2				
Please p	rovide project update	s and correction	ns to:		
	encer, Planning and				

jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch**

Summary of Agricultural Emissions Research in California								
Project ID 13	Project Type Dairy Emissions	Status	Completed	Estimated Completion Date	September 2009			
Project Name	e nd Reducing Air Emiss	iona from Dair	, Fooding Opers	utiono				
Estimating at	id Reducing All Emiss	ions nom Dany	reeding Opera	itions				
Project Desc	ription neasure VOC sources							
PI 1	Affiliation	PI 1	Fund Source 1		Amount 1			
				2				
F. Mitloehner	OC Davis		JSDA - CSREE	5	\$278,000			
F. Mitloehner	Affiliation		Fund Source 2	3				
		PI 2		3	\$278,000			

CSU Fresno

#### Report Location

C. Krauter

Several study presentations, see below; no final report located.

CSU Fresno

### Related info 1

http://www.ag.iastate.edu/wastemgmt/Mitigation\_Conference\_proceedings/CD\_procee dings/Animal\_Housing-Treatment/Calvo-Freestall\_housing.pdf

### Related info 2

http://www.airquality.nrcs.usda.gov/AAQTF/Documents/200809\_201008/200905\_Fres noCA/01\_Zhang\_AAQTF\_200905.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 14	Project Typ Dairy Nutri		Status	Completed	Estimated Completion Date	June 2008	
Project Name							
Nutrient Bala	nces in Cali	fornia Dairy	Herds				
Project Desci							
Valley, was u	sed to evalu	uate the imp	act of minera	ls in drinking w	n California's Cen rater on nutrient from lactating da		
PI 1		Affiliation P	I 1	Fund Source 1		Amount 1	
A. Costillo		UCCE Mer		UC ANR		\$40,000	
A. Oostiilo						ψ . σ,σσσ	
PI 2		Affiliation P	12	Fund Source 2		Amount 2	
F. Mitloehner		UC Davis					
PI 3		Affiliation P	13	Fund Source 3		Amount 3	
D. Bacon		UCCE Tula	re				
Report Loca	tion						
http://californ	niaagricultur	e.ucanr.org/	landingpage.	cfm?article=ca	.v061n02p90&ab	stract=yes	
Related info	1						
Related info	2						
Janet Sp		ning and Te	and correction chnical Supp				

916.324.2717

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Estimated	March 2008
15 Dairy Emissions		-	Completion	
			Date	

#### Project Name

Effects of Dietary Rumensin® on GHG and VOC Emissions from Lactating Dairy Cows

#### Project Description

Feed additives, like monensin sodium (monensin), have been thought to improve cattle health and productivity, and have been used for these reasons for decades. industry is the impact the dairy industry has on the environment. A main environmental concern associated with the dairy industry is the emission of volatile organic compounds (VOC) and greenhouse gases (GHG).

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 Eli Lilly-Elanco	Amount 1 \$50,000
PI 2 E. DePeters	Affiliation PI 2 USDA-ARS	Fund Source 2	Amount 2
PI 3 J. MacGarvey	Affiliation PI 3 USDA - ARS	Fund Source 3	Amount 3

#### Report Location

http://www.extension.org/pages/Environmental\_Responses\_to\_Dietary\_Monensin\_in\_Lactating\_ Dairy\_Cows

#### Related info 1

Hamilton, S.W., E.J. DePeters, J.A. McGarvey, J. Lathrop, and F.M. Mitloehner. 2010. Greenhouse Gas, Animal Performance, and Bacterial Population Structure Responses to Dietary Monensin Fed to Dairy Cows. J. Environm. Qual. 39:1-9

#### Related info 2

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project Description The goal of this Professional Development Program grant is to reduce the environmental impacts of dairy farming in the West as a way to promote and guarantee the sustainability of the milk and cheese industries. The grant recipients plan to train agricultural professionals, selected from around the dairy producing areas of the Western region, on the best management practices available to dairy producers to mitigate the degradation of air quality. Four hands-on workshops will be conducted,  PI 1	Project ID 16	Project Typ Dairy Air Q		Status	Completed	Estimated Completion Date	May 2	010
P. Ndegwa  WSU  USDA - SARE  \$89,000  PI 2 F. Mittloehner  Affiliation PI 2 UC Davis  Fund Source 2  Amount 2  Fund Source 3  Amount 3  Report Location  No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	Project Name	)						
The goal of this Professional Development Program grant is to reduce the environmental impacts of dairy farming in the West as a way to promote and guarantee the sustainability of the milk and cheese industries. The grant recipients plan to train agricultural professionals, selected from around the dairy producing areas of the Western region, on the best management practices available to dairy producers to mitigate the degradation of air quality. Four hands-on workshops will be conducted,  PI 1	Western Reg	ion Dairy O	dor and Air	Quality Educ	ation			
The goal of this Professional Development Program grant is to reduce the environmental impacts of dairy farming in the West as a way to promote and guarantee the sustainability of the milk and cheese industries. The grant recipients plan to train agricultural professionals, selected from around the dairy producing areas of the Western region, on the best management practices available to dairy producers to mitigate the degradation of air quality. Four hands-on workshops will be conducted,  PI 1	D D	ation (Const.)						
P. Ndegwa  WSU  USDA - SARE  \$89,000  PI 2 F. Mittloehner  Affiliation PI 2 UC Davis  Fund Source 2  Amount 2  Fund Source 3  Amount 3  Report Location  No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	The goal of the environmentaguarantee the plan to train a of the Wester	nis Professial impacts of sustainab gricultural progressions of the sustainab	of dairy farm ility of the m professional n the best m	ing in the We ilk and chees s, selected fr nanagement p	st as a way to pro e industries. The om around the da practices available	mote and grant recipients iry producing a e to dairy produ	reas cers	
P. Ndegwa  WSU  USDA - SARE  \$89,000  PI 2 F. Mittloehner  PI 3 R. Sheffield  Affiliation PI 3 Univ. of Idaho  Report Location  No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	PI 1		Affiliation F	PI 1	Fund Source 1		Amo	ount 1
F. Mittloehner  UC Davis  Affiliation PI 3 Univ. of Idaho  Report Location  No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)			WSU		USDA - SARE		\$	89,000
F. Mittloehner  UC Davis  Affiliation PI 3 Univ. of Idaho  Report Location  No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	PI 2		Affiliation F	71 2	Fund Source 2		Amo	ount 2
R. Sheffield  Univ. of Idaho  Report Location  No report, this was an educational effort  Related info 1  Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)		r	UC Davis					
Report Location  No report, this was an educational effort  Related info 1  Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	PI 3		Affiliation F	213	Fund Source 3		Amo	ount 3
No report, this was an educational effort  Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	R. Sheffield		Univ. of Ida	aho				
Related info 1 Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	Report Locat	tion						
Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	No report, th	is was an e	ducational e	effort				
Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)	Related info	1						
Deleted into 2			NM State (	R. Hagevoor	t) and OSU (M. G	amroth)		
Related IIIIO 2	Related info	2						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

-	Project Type Steer Emissions	Status	Completed	Estimated Completion	2010
				Date	

### Project Name

Volatile Organic Compound and Greenhouse Gas Emissions from Growing and Finishing Feedlot Steers and Their Waste

#### **Project Description**

To quantify volatile organic compounds (alcohols, volatile fatty acids, amines, and phenols) and greenhouse gas (methane, nitrous oxide, and carbon dioxide) emissions from receiving, growing and finishing feedlot steers (enteric fermentation) and fresh waste using environmental chambers at UC Davis.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	California Cattlemen Assoc.	\$169,590
DL 0	Affiliation DLO	Fund Course 2	A
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA - ARS	California Feeder Council	\$0
PI 3	Affiliation DL 2	Fund Course 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
		ARB/CCOS	\$10,000

#### Report Location

J Environ Qual. 2011 May-Jun;40(3):899-906. doi: 10.2134/jeq2010.0354

#### Related info 1

Costs to be split between the two funding sources

#### Related info 2

ftp://ftp.arb.ca.gov/carbis/ptsd/polcomm/011008/concon.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 19	Project Ty Equipmer		Status	Completed	Estimated Completion Date	Decen	nber 2006
Project Name							
		g Funds Prog	ram				
		g					
Project Descr							
No descriptio http://animals			ulty/Mitloehne	er/pdf/Grants.pdf			
DI 4		Affiliation P	1.1	Fund Source 1		Λmc	ount 1
<mark>PI 1</mark> F. Mitloehner		UC Davis		UC Davis, Chanc	cellor for		40,000
F. Mittoenner		OC Davis		Research	ellor for	φι	40,000
PI 2		Affiliation P	12	Fund Source 2		Amo	ount 2
PI 3		Affiliation P	13	Fund Source 3		Amo	ount 3
Report Locat							
Not Applicab	ole						
Related info	1						
Related info	2						
Janet Spe	encer, Pla @arb.ca.g	ect updates a nning and Teo ov					

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 20	Project Typ Covered La		Status	Completed	Estimated Completion	Februrary 200	19
	Emissions				Date		
Project Name	e						
		r Emission	Measuremer	nts			
Project Desc	ription						
				airies with CEC f			
				tion Program (DF ologically based a			
				rojects on Califor		lion	
<b>3</b>	(	,,	g	,			
임1		Affiliation F	PI 1	Fund Source 1		Amount 1	
P. Sousa		WURD		T dila Codice T		\$500,000	
. 00000							
기 2		Affiliation F	12	Fund Source 2		Amount 2	
M. Summers	,	Summers					
							╛
기 3		Affiliation F	913	Fund Source 3		Amount 3	
Report Loca	ition						
http://www.e	nergy.ca.go	v/2009publi	cations/CEC	-500-2009-009/C	CEC-500-2009-0	09.PDF	
		.,,_000pas	0400, 0 = 0	200 2000 000, 0			
Dalatad info	. 1						
Related info	) 1						
Related info	2						
Please p	rovide proje	ct updates	and correctio	ns to:			

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type Dairy PM, NH3	Status	Completed	Estimated Completion	July 2005			
22	Sources			Date				
Duningt Name					, 			
<mark>Project Name</mark> Agricultural s	ources of PM10 and o	zone precursoi	rs					
ignountariar o	odrood or r wro drid oz	zono procurso:						
Project Desci	ription							
Compile PM10 and NH3 emission factors. Measure concentrations of VOC relevant to								
o ozone form	nation upwind and dow	nwind of dairie	s					
PI 1	Affiliation I	PI 1	Fund Source 1		Amount 1			
R. Flocchini	UC Davis		JSDA		\$374,145			
PI 2	Affiliation I		Fund Source 2		Amount 2			
C. Parnell	Texas A&I	M						
PI 3	Affiliation I	PI 3	Fund Source 3		Amount 3			
R. Higashi	UC Davis							
Report Locat	tion			<u>'</u>				
Several publ	ications, see Related I	nfo						
Related info	1							
	eeis.usda.gov/web/cris	sprojectpages/	192080.html					
Related info	2							
	rovide project updates encer. Planning and Te							

jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	June 2007
23	Dairy Emissions			Completion	
	Modeling			Date	

### Project Name

Developing a Process Based Model for GHG for California Dairies

### Project Description

Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CEC PIER	\$119,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Salas	Applied		
	Geosolutions, LLC		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
	UC Davis	r drid Sodroe o	7 tilloditt o
R. Zhang	OC Davis		

#### Report Location

http://www.arb.ca.gov/research/rsc/2-25-10/feb10adv.pdf

### Related info 1

Funded with \$500,000 total - \$119,00 for Mitloehner portion

### Related info 2

http://www.westerndairies.org/2009symposium/Mitloehner.pdf

# California Air Resources Board **Emission Inventory Branch**

			<u></u>	LIIIISSIOIIS NE			
Project ID 24	Project Tyl Ammonia		Status	Completed	Estimated Completion	2005	
					Date		
Project Name							
Jevelopment	t of a Proce	ss-Based Ar	nmonia Mod	lel for Livestock S	Sources		
Project Desc	ription						
feeding opera				issions from five nd turkey.	types of animal		
PI 1		Affiliation P		Fund Source 1		Amou	nt 1
G. Tonnesen		UC Riversi	de	LADCO		\$250	0,000
PI 2		Affiliation P		Fund Source 2	Amou	nt 2	
Z. Wang		UC Riversi	de				
PI 3		Affiliation P	13	Fund Source 3		Amou	nt 3
R. Zhang		UC Davis					
Report Loca	tion						
http://www.e	pa.gov/ttnc	hie1/confere	nce/ei14/ses	ssion1/mansell.po	lf		
Related info	n 1						
		Fadel, R. Zh	ang, G. Mar	sell, J. Haasbeek	Κ.		
Related info	2						

Please provide project updates and corrections to: Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

Abstract on page 9 at: http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	oject Typ iry Air Qu		Status	Completed	Estimated Completion Date	March 2005	
Project Name							
Development of a Program (CDQAI		odule Currid	culum for the	California Dairy	Quality Assuran	ce	
Project Description	on						
Develop curriculurequirements	um to as	sist produce	ers in meetin	g the new air qua	llity permit		
PI 1		Affiliation P	I 1	Fund Source 1		Amount 1	
F. Mitloehner		UC Davis		US EPA		\$50,000	
PI 2		Affiliation P	12	Fund Source 2		Amount 2	
D. Meyer		UC Davis,					
PI 3		Affiliation P	13	Fund Source 3		Amount 3	
M. Payne		CDQAP					
Report Location							
http://www.cdqa.	.org/repo	orts/annual_	report_2005	.asp			
Related info 1 http://www.4cleanair.org/Documents/APCODetermination.pdf							
Related info 2							
Please provid			and correctio				

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

	Project Type Dairy Emissions	Status	Completed		Estimated Completion Date	December 2005			
Project Name	9								
l aser-hased	asar-hased Sensors for Monitoring Ammonia Emissions								

#### **Project Description**

A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1 C. Patel	Affiliation PI 1 Pranalytica, Inc.	Fund Source 1 USDA - SBIR I	Amount 1 \$20,000
C. Palei	Tanaiyiida, inc.	OODA OBIRT	Ψ20,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

#### Report Location

http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf

### Related info 1

\$79,000 total; \$20,000 for Mitloehner portion

### Related info 2

Institute of Physics Publishing, Meas. Sci. Technol. 16 (2005) 1547-1553

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 27	Project Typ Dairy Emis		Status	Completed	Estimated Completion Date	December 2006	
Project Name	<del></del>						
Laser-based		Monitoring	Ammonia Ei	missions			
Project Desc	ription						
has been dev testing was p	veloped for erformed in	measuring a environmer	mbient amm ntal chamber	nced photoacoust nonia in agricultura rs at UC Davis who ulate, providing a	al settings. Field ere the excreta	d	
PI 1		Affiliation P	l 1	Fund Source 1		Amount 1	
C. Patel		Pranalytica		USDA - SBIR II		\$75,000	
PI 2		Affiliation P	12	Fund Source 2		Amount 2	
F. Mitloehner		UC Davis					
PI 3 Fund Source 3 Amount 3					Amount 3		
Report Location http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf							
Related info 1							
\$350,000 (\$75,000 for Mitloehner portion)							
Related info	2						
		ct updates a					

jspencer@arb.ca.gov

916.324.2717

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	pe	Status	Completed	Estimated	July 2005
28	Pig Study				Completion	
					Date	
Project Name	^					
Effect of Atm		mmonia on F	Pig Welfare			
Lifect of Atti	ospilelic Al	illillollia oli i	ig Wellale			
Project Desc						
				ced photoacoust		
				in agricultural s		
				Davis where the		
noistein cow	s were allow	wed to accur	nuiate, provi	ding a source of	ambient ammor	ila.
PI 1		Affiliation F	11	Fund Source 1		Amount 1
F. Mitloehner	r	UC Davis		National Pork B	oard	\$40,000
						· 
PI 2		Affiliation F	01.2	Fund Source 2		Amount 2
F12		Allillation	12	Fulla Source 2		Amount 2
PI 3		Affiliation P	213	Fund Source 3		Amount 3
Report Loca	ition					
la ttaa . //		/:/:-4	F = 2 / 14 F = 2 = 4	27 - 44		
nttp://www.a	iasv.org/sna	ap/issues/v1	5n3/v15n3p1	37.par		
Related info	. 1					
Related IIIIC	<i>)</i>					
Related info	2					
Please p	rovide proje	ect updates a	and correctio	ns to:		
			chnical Supp			
icnoncor	@arh ca do	N/				

916.324.2717

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	September 2011
29	Worker Exposure,			Completion	
	Dairies			Date	

### Project Name

Respiratory Exposures and Health of Workers on California Dairies (NIOSH)

### Project Description

Monitor exposures of 200 dairy workers at large dairies to dust and ammonia to define the concentrations of any airborne pollutants highly associated with respiratory problems.

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 NIOSH	Amount 1 \$1,700,000
PI 2 M. Schenker	Affiliation PI 2 UC Davis	Fund Source 2	Amount 2
PI 3 D. Bennett	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

### Report Location

http://factsreports.revues.org/492

#### Related info 1

UC Davis' program - CA Dairy Environ Health Research Inititative (Cal-DEHRI)

### Related info 2

Field phase in progress, June 2008

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Ty		Status	Completed	Estimated	February 2006
30	Ozone Imp	pacts			Completion	
					Date	
Project Name	0					
		heric Ozone	Impacts of S	elected Pesticides		
TiveStigation	or Auriospi	10110 020110	impaoto oi o	cicolou i colloluce	,	
Project Desc						
				zone impacts for ently available.	selected pestic	ае
Zompounds i	OI WITICIT SU	ion esimale:	s are not cuit	ently available.		
임 1		Affiliation P	11	Fund Source 1		Amount 1
W. Carter		UC Riversi		ARB		\$100,000
w. Carter				,		ψ100,000
기 2		Affiliation P	1 2	Fund Source 2		Amount 2
. Malkina		UC Riversi		runa Source 2		Amount 2
· Maikina		o c ravoron				
기 3		Affiliation P	1 2	Fund Source 3		Amount 2
-13		Annauon P	13	runa Source S		Amount 3
Damantlasa	4:					
Report Loca	ition					
Report of Ja	n. 10, 2007	' available at	: http://www.a	arb.ca.gov/researd	ch/apr/past/04-	334.pdf
D 1 ( 1) (	4					
Related info	) 1					
D 1 ( 1) (	0					
Related info	) 2					
L						
			and correction			
	encer, Pian @arb.ca.go		chnical Supp	Off Division		
Japencer	warb.ca.go	) V				

916.324.2717

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

		,	•				
Project ID 31	Project Typ		Status	Completed	Estimated Completion	Augus	st 2008
					Date		
Project Name	<u> </u>						
		C Sources	and their Ph	otochemical Ozon	e Formation		
Project Desc	ription						
				nical O3 formation n Joaquin Valley.	potential of VO	Cs	
PI 1		Affiliation F	11	Fund Source 1		Am	ount 1
R. Flocchini		UC Davis		USDA		\$4	400,000
PI 2		Affiliation F	912	Fund Source 2		Am	ount 2
R. Higashi		UC Davis					
PI 3		Affiliation F	213	Fund Source 3		Am	ount 3
M. Kleeman		UC Davis					
Report Loca http://www.re		ov/web/crisp	projectpages	/204179.html			
Related info	1						
http://airqua	lity.ucdavis	.edu/pages/	events/2008	/green_acres/GRE	EEN.pdf		
Related info	2						

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 32	Project Typ Pesticide F Water Seal	umigation	Status	Completed	Estimated Completion Date	2005	
Project Name	)						
Commercializ		ermittent Wa	ater Sealing				
Project Desc							
Identify optim application of		nagement s	strategies for	water sealing com	mercial-scale		
PI 1		Affiliation P	11	Fund Source 1		An	nount 1
D. Sullivan		Sullivan Environme		USDA			\$78,000
PI 2		Affiliation P	12	Fund Source 2		An	nount 2
H. Ajwa		UC Davis					
PI 3		Affiliation P	13	Fund Source 3		An	nount 3
J. Radewald		UC Davis					
Report Loca http://www.s		com/sciend	ce/article/pii/S	00456535080039	13		
Related info		BAO%2020	05%20pdfs/F	Preplant/8/Sullivan	.pdf	0000000	
Related info			and correction				

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 33	Project Typ Soil Ammo Emissions		Status	Completed		Estimated Completion Date	Decen	nber 2005
Project Name	e							
		mates of An	nmonia Emis	sions from Nativ	ve So	ils in Califori	nia	
Project Desc								
Develop Cali within Califor		fic ammonia	emission fa	ctors and mode	ling fo	or native soil	S	
PI 1		Affiliation P	11	Fund Source 1			Amo	ount 1
C. Krauter		CSU Fresn		ARB				200,000
PI 2		Affiliation P	12	Fund Source 2			Amo	ount 2
C. Potter		NASA Ame	es					
PI 3		Affiliation P	13	Fund Source 3			Amo	ount 3
S. Klooster		CSU Monte						
Report Loca	tion							
http://www.e	pa.gov/ttn/c	hief/confere	nce/ei12/par	t/krauter.pdf (20	003)			
Related info	n 1							
		/sge/casa/re	gional/califo	rnia.html				
Related info								
Please p	rovide proje	ct updates a	and correctio	ns to:				

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

## California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	June 2005
34	Crop Ammonia			Completion	
	Emissions			Date	

### Project Name

Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser

#### Project Description

Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$296,000
DI 0	A #FILL - C DI O	F	A 1 O
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	\$148,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Unisearch	\$148,000

### Report Location

Partial, 2005 EPA conference. http://www.epa.gov/ttn/chief/conference/ei14/index.html (search Krauter)

### Related info 1

http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo\_pres.pdf

#### Related info 2

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	<mark>Project Type</mark> Crop PM Em		Status	Completed	Estimated Completion Date	Dec. 2	2012
Project Name							
Cotton Gin PM	/I Emissions	Research,	contract 09-	01PM			
Project Descri	ption						
estimate PM e	emissions (Codels for PM1	TM-039, P 0, PM2.5,	2.5 Stack Satotal suspen	hods which may si ampling Method). I ded particulates (T	Develop PM		
PI 1	A	ffiliation PI	1	Fund Source 1		Am	ount 1
D. Whitelock	A	RS - SW C Sinning Res	Cotton	Various cotton industry and ginners associations		\$147,500	
PI 2	А	ffiliation PI	2	Fund Source 2		Am	ount 2
M. Buser		K State Ur		ARB		\$45,000	
PI 3	А	ffiliation PI	3	Fund Source 3		Am	ount 3
C. Boykin	C	otton Ginn Research U	ing	SJVAPCD			\$36,000
Report Locati	ion						
See Presenta http://www.nre				at: ational/air/taskforc	e/#		
Related info	1						
Related info	2						

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 36	Project Type Crop PM Emissions	Status	Completed	Estimated Completion Date	2011
Project Name	<i>j</i>				1
	atter Emissions from I	Raisin Harvest			
Project Desc	<mark>ription</mark> I emissions of raisin ha	arvesting techn	igues: conventio	nal tray continu	IOUS
tray, dried on			4		
PI 1	Affiliation	PI 1	Fund Source 1		Amount 1
Alex Alexand			USDA-NRCS		\$0
PI 2	Affiliation	PI 2	Fund Source 2		Amount 2
C. Krauter	CSU Fres	ino	SJVAPCD		\$0
PI 3	Affiliation	PI 3	Fund Source 3		Amount 3
S. Ashkan	CSU Fres	sno			\$0
Report Loca	tion				
Under review	v by SJVAPCD, April 2	2012			
NOULOG IIII					
Related info	2				
Janet Sp	rovide project updates encer, Planning and T @arb.ca.gov 2717				

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	S	Status	Completed	Estimated	2010
37	Emissions Mit	igation			Completion	
					Date	
Project Name						
	termine Emiss	ions Reduction	ns Achiev	ed by Lower E	mitting Agricultu	ral
ractices						
Project Desci	rintion					
valuation of	control effective	eness of two	SJVAPCI	O Conservation	Management	
	PM (conservat				···aiiagee	
	(5555			a op o. a)		
기 1	Af	filiation PI 1	F	und Source 1		Amount 1
JS EPA RAR	RE		U	S EPA RARE		
Study						
	Λ.6	Ciliatian DI O				A
인 2	An	filiation PI 2		und Source 2		Amount 2
			U	SDA		
기 3	Af	filiation PI 3	F	und Source 3		Amount 3
			S	JVAPCD		
Danastiaaa	ti					
Report Loca	tion					
Available as	pdf via search	terms from cf	nuh ean (	nov		
wanabio ao	par via ocaron		pub.oup.	<b>30 v</b>		
Dalatad into	. 4					
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	rovide project ι					
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916.324.2717

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	ct Type	Status	Completed	Estimated	October 2007
	cide VOC			Completion	
Emis	sions			Date	
		_			
Project Name					
PR Round-Robin	VOC Study				
Project Description	1				
Determine ways to		nission estimat	es for solvents	in pesticide	
ormulations by co					ı in
raditional TGA tes					
out only slightly. Mo					
peing regulated bu		el. To decreas	e ozone, NOx r	eduction more	
mportant than VO	C reduction.				
	A ((1))				
인 1	Affiliation I		und Source 1		Amount 1
P. Green	UC Davis		JSDA-CSREES		\$0
기 2	Affiliation I	PI 2	und Source 2		Amount 2
임 3	Affiliation I	DI 3	und Source 3		Amount 3
10	/ IIIIIation	10	una Oddrec o		7 tilloditt o
Report Location					
presentation at CI	DP data unkno	WD:			
http://www.cdpr.ca			oc regional oz	one ndf	
intp.//www.capi.ce	1.gov/docs/cirion/	vocs, vocproj, v	oc_regional_oz	onc.pai	
D 1 ( 1) ( 4					
Related info 1					
Related info 2					
Planca provida	project updates	and correction	o to:		

jspencer@arb.ca.gov 916.324.2717

# California Air Resources Board **Emission Inventory Branch**

Project ID 40 Project Soil VO Mititgat	C Emissions	<u>Status</u> Cor	mpleted	Estimated Completion Date	Decemb	oer 2009
Project Name						
Reducing Emissions	of VOCs from Agi	ricultural Soil Fui	migation, Al	RB contract 05-	351	
Project Description	tanaian, Davalan	actimates for all	uma ulativa an	d bourby omigai	iono	
Original study plus ex rates from laboratory					ions	
previous large-scale						
-	·					
PI 1	Affiliation PI 1	Fund	Source 1		Amou	ınt 1
	Affiliation PI 1 UC Riverside	100000000000000000000000000000000000000	Source 1			unt 1 0,000
		100000000000000000000000000000000000000	Source 1			
PI 1 Scott Yates	UC Riverside  Affiliation PI 2	ARB Fund	Source 2		\$20 Amou	0,000 int 2
Scott Yates	UC Riverside	ARB Fund			\$20 Amou	0,000
Scott Yates PI 2 Jay Gan	UC Riverside  Affiliation PI 2  UC Riverside	ARB  Fund USDA	Source 2		\$20 Amou	0,000 int 2
PI 2 Jay Gan	Affiliation PI 2 UC Riverside  Affiliation PI 3	ARB  Fund USDA  Fund	Source 2		\$20 Amou	0,000 int 2 0,000
Scott Yates PI 2 Jay Gan	UC Riverside  Affiliation PI 2  UC Riverside	ARB  Fund USDA  Fund	Source 2 A-ARS		\$20 Amou \$10	0,000 int 2 0,000
PI 2 Jay Gan	Affiliation PI 2 UC Riverside  Affiliation PI 3	ARB  Fund USDA  Fund	Source 2 A-ARS		\$20 Amou \$10	0,000 int 2 0,000
PI 2 Jay Gan PI 3 M. Majewski	Affiliation PI 2 UC Riverside  Affiliation PI 3	ARB  Fund USDA  Fund	Source 2 A-ARS		\$20 Amou \$10	0,000 int 2 0,000
PI 2 Jay Gan	Affiliation PI 2 UC Riverside  Affiliation PI 3 UC Riverside	ARB  Fund USDA  Fund	Source 2 A-ARS		\$20 Amou \$10	0,000 int 2 0,000

Related info 1
ARB agreement 05-351

### Related info 2

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

41	Dairy & Fe	edlot	Status	Completed	Completion	August 2001
	Emissions	5			Date	
Project Nam	е					
		M10 in the S	an Joaquin V	/alley		
				•		
Project Desc	cription					
		emissions.	Evaluate PM	10 and ammonia	emissions for	
feedlots and						
PI 1		Affiliation F	PI 1	Fund Source 1		Amount 1
R. Flocchini		UC Davis		USDA		
PI 2		Affiliation F	PI 2	Fund Source 2		Amount 2
T. Cassel		UC Davis				
PI 3		Affiliation F	213	Fund Source 3		Amount 3
Report Loca	ation					
http://www.a	arb.ca.gov/r	esearch/apr/	reports/l2022	2.pdf		
	<b>5</b>		•	•		
D 1 ( ) (						
Related info	0 1					
Dolotod info	o 2					
Related info	0 2					
Diagram						
			and correctio chnical Supp			
	r@arb.ca.go		orinical oupp	OR DIVISION		
916.324						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

42	Project Typ Soil Ammo Emissions		Status	Completed	Estimated Completion Date	December 2004		
Project Name Statewide Inve Fertilizers in C		mates of Am	nmonia Emis	sions from Native	Soils and Cher	nical		
	model amn			gricultural fertilizer gov/carbis/reports		I e		
PI 1		Affiliation P	1 1	Fund Source 1		Amount 1		
C. Krauter		CSU Fresn		ARB		\$186,425		
PI 2		Affiliation P	12	Fund Source 2		Amount 2		
C. Potter		NASA Ame	es	NASA Ames				
PI 3		Affiliation P	13	Fund Source 3		Amount 3		
S. Klooster		CSU Monte	erey					
Report Locati	on							
http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/00-0515Krauter2006.pdf								
Related info	4							
Related IIIIO								
Related info								
Please pro	ovide proje	ct updates a	and correctio	ns to:				

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

C. Schmidt  Consultant  South Coast AQMD  Affiliation PI 2  Fund Source 2  Amount 2	Project ID 43 Project Typ Dairy Emis							
Results of the Measurement of PM10 Precursor Compounds from Dairy Industry Livestock Waste  Project Description Using environmental flux chambers, evaluate dairy ammonia and ROG emissions.  PI 1 C. Schmidt  Affiliation PI 1 Consultant  Fund Source 1 South Coast AQMD  Affiliation PI 2  Fund Source 2  Amount 2	oiect Name							
Using environmental flux chambers, evaluate dairy ammonia and ROG emissions.  Pl 1 C. Schmidt  Affiliation Pl 1 Consultant  Fund Source 1 South Coast AQMD  Fund Source 2 Amount 2	esults of the Measuren							
PI 1 C. Schmidt  Affiliation PI 1 Consultant  Fund Source 1 South Coast AQMD  Fund Source 2 Affiliation PI 2 Fund Source 2 Amount 1								
C. Schmidt  Consultant  South Coast AQMD  Affiliation PI 2  Fund Source 2  Amount 2	sing environmental flux							
C. Schmidt  Consultant  South Coast AQMD  Affiliation PI 2  Fund Source 2  Amount 2	1							
Affiliation DLO	2							
PI 3 Affiliation PI 3 Fund Source 3 Amount 3	3							
Report Location http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf								
Related info 1 http://www.aqmd.gov/rules/proposed/pr1127.html								
Related info 2 http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf  Please provide project updates and corrections to:	nttp://www.epa.gov/ttn/							

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	ct Type	Status	Completed	Estimated	January 1995	
44 Dairy	Emissions			Completion Date		
Project Name		(ila Oussais C	)	1 in a start N/ 1		
Results of the Meas	surement of Volat	ille Organic C	compounds from	Livestock Wast	es	
Project Description  Evaluate process sp	necific VOCs from	n dairies in th	ne Sacramento re	egion		
Evaluate process s	Secine voos noi	ii daiiles iii ti	ic dacramento n	ogion.		
PI 1	Affiliation P	11	Fund Source 1		Amount 1	
C. Schmidt	Consultant		US EPA			
PI 2	Affiliation P	'l 2	Fund Source 2		Amount 2	
DI 2	Affiliation F	N 0	Fund Course 2		A == = + = + = 2	
PI 3	Affiliation P	13	Fund Source 3		Amount 3	
Report Location						
Related info 1						
http://www.4cleana	air.org/Document	:s/APCODete	rmination.pdf			
	-					
Related info 2						
Place provide	project updates a	and correction	ne to:			
Janet Spencer,	Planning and Te	chnical Supp	ort Division			
jspencer@arb.o						
916.324.2717						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type		Comple		Estimated	January 2	2002	
45	Dairy Emission	าร			Completion Date			
Project Name								
Survey Curre	nt Livestock W	aste Managem	ent Practices in	the South	Coast Air Ba	sin		
Project Desci	ription							
Evaluate mar	nure managem	ent practices in	the SCAQMD					
PI 1	Aff	iliation PI 1	Fund Sou	ırce 1		Amoun	t 1	
Egigian-Nich		tra Tech Inc		ast AQMD				
PI 2	Aff	iliation PI 2	Fund Sou	irce 2		Amoun	Amount 2	
PI 3	Aff	iliation PI 3	Fund Sou	irce 3		Amoun	t 3	
Report Loca	tion							
http://www.a	qmd.gov/rules/	support.html#r1	1127					
Related info	1							
Related info	2							
	rovide project u encer, Planning	pdates and cor						

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ	ре	Status	Completed	Estimated	March 2003
46	Dairy Emis	sions			Completion	
					Date	
Project Name						
				ck Waste Mana	gement Practice	S
Survey and C	Control Option	on Assessm	ent			
Project Desc	ription					
Literature sui		te managem	ent and cont	rol options.		
http://www.ac						
·	. 0		•			
PI 1		Affiliation P		Fund Source 1		Amount 1
Egigian-Nich	ols	Tetra Tech	Inc	South Coast AC	MD	
PI 2		Affiliation P	12	Fund Source 2		Amount 2
PI 3		Affiliation P	1.2	Fund Source 3		Amount 3
PI 3		Allillation	13	runa Source S		Amount 3
Report Loca	ition					
http://www.a	amd gov/ru	loc/cupport l	atml			
πιρ.//www.a	iqina.gov/iu	ies/support.i	10111			
Related info	o 1					
Related Into	) 1					
Related info	2					
Pleasen	rovide proje	ect undates a	and correction	ns to:		
			chnical Supp			
	arb ca go		стпост опрр	0.1 0.11101011		

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	March 2003	
47	Dairy Emis	sions			Completion Date		
					Dato		
Project Name							
				Reducing Ammor			
Livestock Wa	iste Manage	ement Practi	ces Survey a	and Control Option	on Assessment		
Project Desci	ription						
Identify livest							
http://www.ac	md.gov/rule	es/proposed/	pr1127.html				
PI 1		Affiliation PI		Fund Source 1		Amount 1	
Egigian-Nicho	ols	Tetra Tech	inc	South Coast AQ	MD		
PI 2		Affiliation PI	2	Fund Source 2		Amount 2	
PI 3		Affiliation PI	3	Fund Source 3		Amount 3	
5 //							
Report Local	tion						
http://www.a	qmd.gov/ru	les/support.h	tml				
Dolotod info	. 1						
Related info							
Related info	2						
TCIALGU IIIIO	L						
Please	rovide projo	ct updates a	nd correction	ne to:			
		ning and Tec					
	@arb.ca.go						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project ID	Project Type	Status	Completed	Estimated	December 2003
I	48	Dairy Emissions		-	Completion	
L					Date	

#### Project Name

Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership

#### **Project Description**

Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).

PI 1 B. Auvermann	Affiliation PI 1 TAMU CEC	Fund Source 1 National Center for Manure and Animal Waste	Amount 1 \$12,000
PI 2 W. Harman	Affiliation PI 2 TAMU CEC	Fund Source 2	Amount 2
PI 3 D. Meyer	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

#### Report Location

http://www.epa.gov/ttnchie1/conference/ei14/session1/sweeten\_pres.pdf

#### Related info 1

http://ag.arizona.edu/ANS/swnmc/Proceedings/2006/Auvermann\_SWNMC2006.pdf

#### Related info 2

http://amarillo.tamu.edu/library/files/brent\_auvermann\_publications/conference\_procee dings/preliminaryevaluation\_18.pdf

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 49	Project Typ Dairy Emis		Status	Completed	Estimated Completion Date	May 2	006
Project Name	9						
Evaluating Da		s Emissions	Using Flux	Chambers			
Project Desc							
				dairy, evaluate rela sh lanes, and corra			
PI 1		Affiliation P	l 1	Fund Source 1		Amo	ount 1
C. Schmidt		Contractor		ARB			550,000
PI 2		Affiliation P	12	Fund Source 2		Amo	ount 2
				SJVAPCD			
PI 3		Affiliation P	13	Fund Source 3		Amo	ount 3
Report Loca	tion						
Phase II Ted	ch Memo at	: http://www.	arb.ca.gov/a	ag/caf/SchmidtDairy	/TestData2005	.pdf	
Related info							
http://www.4	4cleanair.or	g/Document	s/APCODet	ermination.pdf			
Related info							
http://www.e	epa.gov/ttn/	chief/confere	ence/ei14/se	ession1/schmidt.pdf	f		

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 50	Project Type Dairy Emis		Status	Completed	Estimated Completion	Decer	mber 2005
					Date		
Project Name	3						
		nissions in a	an Environm	ental Chamber			
J	,						
Project Desc	ription						
		onmentally	controlled ch	namber and evalua	ite speciated V	C	
				esh waste produc			
PI 1		Affiliation F	21.1	Fund Source 1 US EPA		Amount 1	
F. Mitloehner	•	UC Davis		US EPA		;	\$75,000
DLO		A ((')' (' E	N 0	F 10 0		^	1.0
PI 2 R. Flocchini		Affiliation F	12	Fund Source 2		Am	ount 2
IX. I loccillil							
PI 3		Affiliation F	013	Fund Source 3		Amı	ount 3
J. Peters		7 timation 1	10	I dila Codico o		7 (111)	Suite S
Report Loca	tion						
h 11//	-1 /-	/	D - i O l-		000 46		
nttp://www.a	rb.ca.gov/a	g/cat/ivittioei	nnerDairyCn	amberEmissions2	006.par		
Related info		<u></u>	· /ADCCE				
http://www.4	1cleanair.or	g/Document	ts/APCODet	ermination.pdf			
Dolotod info							
Related info		622 (2008)					
C LIVII OII Q		022 (2000)					

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Ouiiii	nary or As	jiioaitaiai	Limbsions ite			L
Project ID 51	Project Ty Dairy Emis		Status	Completed	Estimated Completion Date	May 2	006
Project Name							
Volatile Fatty	Acids, Am	ine, and Phe	nol Emissio	ons from Cows and	d their Waste		
Project Desc	ription						
Compounds chamber.	were meas	ured from di	y and lacta	ting Holstein cows	in an environme	ental	
PI 1		Affiliation F	11	Fund Source 1		Amo	ount 1
F. Mitloehner		UC Davis		ARB			200,000
PI 2		Affiliation F	12	Fund Source 2		Amo	ount 2
S. Trabue		USDA ARS					
PI 3		Affiliation F	13	Fund Source 3		Amo	ount 3
J. Koziel		ISU					
Report Loca	tion						
http://www.a	rb.ca.gov/a	ig/caf/Mitloel	nnerDairyC	hamberEmissions	2006.pdf		
Related info							
http://www.4	1cleanair.oı	rg/Documen	s/APCODe	termination.pdf			
Related info	2						
http://jeq.sc	ijournals.or	g/cgi/conten	t/full/37/2/6	15			

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 52	Project Typ Almond Ha Emissions		Status	Completed	Estimated Completion Date	June 2004
Project Name	e					
		nission facto	ors for almor	nd harvesting		
Project Desc						
Refine existii measured Pl					timates based or	
PI 1		Affiliation P	I 1	Fund Source 1		Amount 1
R. Flocchini		UC Davis		Almond Board o	of California	7 tillouit 1
PI 2		Affiliation P	12	Fund Source 2		Amount 2
C. Parnell		Texas A&M	1			
PI 3		Affiliation P	13	Fund Source 3		Amount 3
Report Loca	ition					
http://caaqe	s.tamu.edu/l	Publications	/Publications	s/PU01107.pdf		
Related info	n 1					
		/abstract.as	p?aid=20039	9&t=2		
Related info	2					
			and correctio			

jspencer@arb.ca.gov

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Estimated	July 2007
53 Dairy Emissions	;		Completion	
			Date	

#### **Project Name**

Photochemical Ozone Formation Potential of Agricultural VOC Sources

#### **Project Description**

Some recent estimates predict that dairy cattle are second only to on-road vehicles as a leading source of ozone precursor emissions in California's San Joaquin Valley. The objective of this work was to directly measure the ozone formation potential from dairy housing.

PI 1 P. Green	Affiliation PI 1	Fund Source 1 USDA	Amount 1 \$300,000
	Affiliation DLO	Ford Occurs 0	Amazarato
F. Mitloehner	Affiliation PI 2	Fund Source 2	Amount 2
PI 3 R. Flocchini	Affiliation PI 3	Fund Source 3	Amount 3

#### Report Location

http://www.sciencedirect.com/science?\_ob=ArticleURL&\_udi=B6VH3-4S0YXTM-2&\_user=1928924&\_rdoc=1&\_fmt=&\_orig=search&\_sort=d&view=c&\_version=1&\_urlVersion=0& userid=1928924&md5=e020b1203499a23d500c0127b4460438

#### Related info 1

presentation at CDPR, date unknown:

http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc\_regional\_ozone.pdf

#### Related info 2

Alternate site for report: Go to http://dx.doi.org and enter "doi:10.1016/j.atmosenv.2008.02.064"

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ	oe	Status	Completed	Estimated	May 2005
54	Broiler Emi	issions			Completion	
					Date	
						<u></u>
Project Name	e					
Measuring B	roiler Emiss	ions in Tunr	nel Ventilated	Housing		
D: ( D	utu et au					
Project Desc		mania and a	*************	s were measure	d pariadiaally du	rin a
				ays of production		ring
between bro		ction cycle ii	icidality 45 d	ays of production	Tanu To days	
between bloc	Jus.					
PI 1		Affiliation F	1 1	Fund Source 1		Amount 1
M. Summers		CDFA		California Poultr	y Federation	\$40,000
.vii Gaiiiiiioio						. ,
DI O		A ((:): - (:	VI 0	F		A 1 O
PI 2		Affiliation F		Fund Source 2		Amount 2
D. Duke		Foster Fari	ns			
PI 3		Affiliation F	21 3	Fund Source 3		Amount 3
Report Loca	tion					
Report Loca	LIOTI					
http://www.a	rb.ca.gov/a	g/caf/poulen	nisrpt.pdf			
	, , , , , , , , , , , , , , , , , , ,	J 1	- 1 - 1 -			
Related info	n 1					
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Related info	2					
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			chnical Supp			
•	marh ca go	-	олиоси осир	O. C. DIVIOIOII		

### California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	December 2005
55	Dairy ROG			Completion	
	Emissions			Date	

#### Project Name

Evaluating Dairy Reactive Organic Gas Emissions

#### Project Description

Chemically speciate ROG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes. Further study continues in 2005-2008 (project IDs 6, 7, 8).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	CSU Foundation	\$20,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

#### Report Location

http://www.nrcs.usda.gov/Internet/FSE\_DOCUMENTS/nrcs143\_008799.pdf

#### Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

#### Related info 2

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	September 2008
56	Dairy Waste			Completion	
	Management			Date	

#### Project Name

Dairy Wastewater Treatment Feasibility Study, Contract 08-279

#### **Project Description**

Assess the feasibility of applying standard wastewater treatment technology to the management of

manure from cows in typical California dairies. EPA plans to incorporate this information into its on-going

assessment of technologies for dairy manure management.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Trygve Lundquist	Cal-Poly SLO	US EPA	\$19,936
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

#### Report Location

(When available) http://www.epa.gov/region09/ag/dairy/technologies.html

#### Related info 1

http://www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm

#### Related info 2

http://works.bepress.com/tlundqui/2/

### California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

	Project Type Soil VOC Emissions	Status	Completed	Estimated Completion	June 2011
	Mitigation			Date	

#### Project Name

Reducing Emissions of VOCs from Agricultural Soil Fumigation: Comparing Emission Estimates from Simplified Methodology, ARB contract 07-332

#### **Project Description**

For a single soil, determine the extent to which laboratory and modeling studies can simulate field emission data. Extend the range of emission reduction strategies assessable in the field using the laboratory and modeling approaches. Variables under investigation include columns/furrows, with tarped/untarped, VIF vs. HPDE covered beds/furrows.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Scott Yates	USDA-ARS-	ARB	\$100,000
	Riverside		
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Daniel Ashworth	USDA-ARS	DPR	\$50,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

### Report Location

http://www.arb.ca.gov/research/rsc/10-28-11/item4dfr07-332.pdf

#### Related info 1

ARB agreement 07-332

#### Related info 2

USDA project 5310-12130-008-05

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 58 Greenwa Emission	aste VOC	Status Completed	Estimated Completion Date	January 2010
Project Name				
	sulting from Gree	enwaste Composting (09	-01 CCOS)	
roject Description				
Construct 5 windrows, nethane, hydrogen su	Ifide and moistur solation flux cham	pH, ammonia, nitrate, ni e at the core of the wind ober and analyze sample or 100 days	rows; collect emiss	
PI 1	Affiliation PI 1	Fund Source 1	<u> </u>	Amount 1
Fatih Buyuksonmez	UC San Diego			\$198,000
인 2	Affiliation PI 2	Fund Source 2	2	Amount 2
				\$0
PI 3	Affiliation PI 3	Fund Source 3	3	Amount 3
				\$0
Report Location				
http://valleyair.org/bus STUDY-REPORT.pdf		_factors/Criteria/Criteria/	Composting/FINAL	-COMPOST-
Related info 1				
Related info 2				
TOIGLOG IIIO Z				

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	July 2010
59	NAEMS: Layer			Completion	
	Emissions			Date	

#### Project Name

NAEMS Project: Air Emissions from California Layer Farms (NAEMS CA2B)

#### Project Description

This project is for conducting a two-year measurement and monitoring of air emissions from a layer farm in CA. The emissions from two mechanically ventilated layer houses are measured. The houses have approximately 68,000 hens in cages. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information and data are collected on ventilation, indoor and outdoor

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	Ag Air Research Council	\$199,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0
Report Location			

Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

#### Related info 1

Data under review/compilation by US EPA

#### Related info 2

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Type	Status	Completed	Estimated	July 20	10
60	NAEMS: Broiler			Completion		
	Emissions			Date		
rainat Nama		J				
roject Name	ect: Air Emissions from	California Bro	iler Farms (NAF	MS CA1R)		
ALIVIO I TOJE	Ct. All Lillissions nom	Camornia bio	ilei i aiilis (IVAL)	WIS CATE)		
roject Descr	•		<u> </u>			
	for conducting a two-				40 d	
	m a broiler farm in CA are measured. The two					
	action cycle. The meas				Sacii	
	n dioxide, methane, ni				ds,	
	ed particulates, PM2.5					
YI 1	Affiliation F		und Source 1		Amou	
t. Zhang	UC Davis	P	g Air Research	Council	\$21	19,000
1 2	Affiliation F	기 2 F	und Source 2		Amou	unt 2
						\$0
13	Affiliation F	PI 3	und Source 3		Amou	unt 3
						\$0
Report Locat	ion					
report Local						
nttp://www.ep	oa.gov/airquality/agmo	nitoring/techdo	cs.html			
Related info	1					
Related info	2					

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Ty		Status	Completed	Estimated	Februa	ary 2014
61	Soil NOx	Emissions			Completion		
					Date		
Project Nam							
		e Nitrous Oxi	de Emission	s in California Da	irv Systems		
Contract 09-		e Millous Oxi	ue Lillission	s iii CaiiiOiiiia Da	iry Oysterns,		
Project Desc							
				ystems of three o			
				ed intensively, usi ated. The annual			
				lizer will be accou			
				mitted as N2O, i.e			
specific emis					- i, <b>,</b> - · · · ·		
•							
PI 1		Affiliation F	YI 1	Fund Source 1			unt 1
Villiam Horv	vath	UC Davis		ARB		\$	82,000
12		Affiliation F	12	Fund Source 2		Amo	unt 2
				EDF		\$1	00,000
PI 3		Affiliation F	13	Fund Source 3		Amo	ount 3
		rumadoni		I dila Goalog G		,	\$0
Report Loca	ation		<u> </u>				
Report Loca	111011						
Final draft re	eport subm	itted March 2	.013				
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Related info	o 1						
Related info	0 2						
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### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 62	Project Ty Soil NOx E		Status	Completed	Estimated Completion Date	Februa	ary 2014
Project Name	2						
		ions from So	oil in Californi	ia Cropping Syst	ems to Improve		
Ozone Model				a cropping cycl			
Project Desci							
This is an add-on component to the three on-going baseline nitrous oxide (N2O) monitoring efforts. The results of the study are expected to provide an estimate of NOx emissions from California's agricultural soils and ozone modeling input by including NOx emissions from the soil. See Project IDs 77, 78, 79, & 81.							
PI 1		Affiliation F	PI 1	Fund Source 1		Amo	unt 1
William Horw	ath	UC Davis		ARB			83,500
VVIIII AIII TIOI W	diii					•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
PI 2		Affiliation F	21.2	Fund Source 2		Amo	unt 2
M. Burger		UC Davis		r dila Godioo E		7 11110	\$0
_							
PI 3		Affiliation F	913	Fund Source 3		Amo	unt 3
							\$0
Report Loca  Description:		arb.ca.gov/r	esearch/sing	le-project.php?r	ow_id=64853		
Related info	) 1						
Related info	2						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	May 2011
63	Biogenic VOC			Completion	
	Emissions			Date	

#### Project Name

Flux Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley, Contract 06-329

#### **Project Description**

Develop BVOC simulation platform for central valley agricultural operations and test the modeling performance through ozone and aerosol nucleation event measurements. Micro-meteorological to landscape level emission flux measurement program for certain selected crops identified during the screening phase.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Allen Goldstein	UC Berkeley	ARB	\$400,003
PI 2 John Karlik	Affiliation PI 2 UC Berkeley, Ag Extension	Fund Source 2	Amount 2 \$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3 \$0

#### Report Location

http://www.arb.ca.gov/research/rsc/06-09-11/agenda3\_contract%2006-329\_dfr\_ash.pdf

#### Related info 1

http://www.arb.ca.gov/research/rsc/10-28-11/oct11book.pdf

#### Related info 2

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	In Progress		Estimated	June	2013
64	Biogenic V	OC				Completion		
	Emissions					Date		
D : (N								
Project Name		onio VOC E	imigaiona Esti	mate Using an A	\ irb	orno DTD MO	,	
			intract 09-339	mate Osing an F	AII D	OITIE FIR IVIC	)	
Project Desc								
land cover da	atabases, w then ARB B	ith proper so	caling method	te of BVOC spe ology. The resul ve the modeling	ts c	of this project		
PI 1		Affiliation F	PI 1	Fund Source 1			An	nount 1
Allen Goldste	ein	UC Berkel		ARB				\$400,000
PI 2		Affiliation F	12	Fund Source 2			An	nount 2
Alex Guenthe	er	Natl Cente Research	r Atm					\$0
PI 3		Affiliation F	PI 3	Fund Source 3			An	nount 3
Halfidi Jonss	on	CIRPAS						\$0
	berkeley.ed	du/ahg/pubs	/Goldstein_et	al_CARB_2014.	pdf			
Related info								

### California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project Type Removing H2S from	Status	Completed		Estimated Completion	December 2010
Biogas			_	Date	

#### Project Name

Removal of H2S from Biogas and NOx from Engine Exhaust at a Dairy Digester Using Microwave Technology, contract #ICAT 0803

#### **Project Description**

The project will monitor the performance of the H2S removal system and the NOx removal system on the biogas powered engine at the Tollenaar Holsteins Dairy Farm. Anaerobic digester gas (biogas) is captured from a heated, mixed digester and used to fuel a 212 kW Guascor engine-generator. H2S is currently removed from the biogas using an aerated water bubbler system (Soloscrub).

기 1	Affiliation PI 1	Fund Source 1	Amount 1
Mark Rawson	SMUD	SMUD	\$246,309
인 2	Affiliation PI 2	Fund Source 2	Amount 2
Chang Cha	Cha Corporation		\$0
인 3	Affiliation PI 3	Fund Source 3	Amount 3
Dan Greenberg	Applied Filter Technology		\$0
Report Location			
http://www.energy.ca	a.gov/2013publications/C	EC-500-2013-079/CEC-500-	2013-079.pdf

Related info 1	
Related info 2	

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	2007	
66	Fumigant E	Emissions			Completion		
	Mitigation				Date		
Project Name		<b>-</b>	- in a last a - ti-	and Material by Inc	a a a a tuala la Ellas		
(VIF)	or Fumigant	Emissions u	sing irrigatio	on and Virtually Im	penetrable Film		
Project Desc	ription						
Reductions o (VIF) for 1,3-	of Fumigant D, chloropic	Emissions u crin, methyl b	sing Irrigation	on and Virtually Im	penetrable Film		
PI 1		Affiliation P	I 1	Fund Source 1		Amo	unt 1
Steve Fennin	nore	UC Davis		USDA-CSREES			\$0
PI 2		Affiliation P	12	Fund Source 2		Amo	unt 2
Husein Ajwa		UC Davis		Stawberry Comm	nission		\$0
PI 3		Affiliation P	13	Fund Source 3		Amo	unt 3
							\$0
Report Loca	ition						
http://www.a	igecon.ucda	vis.edu/exte	nsion/updat	e/articles/v9n5_3. <sub> </sub>	pdf		
Related info	o 1						
Related info	2						
Please p	rovide proje	ct updates a	nd correctio	ns to:			

Janet Spencer, Planning and Technical Support Division jspencer@arb.ca.gov 916.324.2717

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed		Estimated	2006	
67	Fumigant E Mitigation	missions				Completion Date		
	·····ganori							
Project Name								
Reductions of (VIF)	f Fumigant l	Emissions us	sing Irrigatio	n and Virtually	y Impe	netrable Film	S	
Project Descr								
Reductions o			sing Irrigatio	n and Virtually	y Impe	netrable Film	S	
PI 1		Affiliation PI	1	Fund Source	1		Amo	unt 1
Thomas Trou	ıt	USDA-ARS						\$0
PI 2		Affiliation PI		Fund Source	2		Amo	unt 2
S. Gao		USDA-ARS						\$0
PI 3		Affiliation PI	3	Fund Source	3		Amo	unt 3
								\$0
Report Locat http://www.e		hstl/AgCon.p	proceedings	_print.pdf				
Related info	1							
Related info	2							
Janet Sp		ct updates a ning and Tec						

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 68 Fumigan Mitigation	t Emissions	Completed Estima Completed Date						
Project Name								
	nt Emissions using Irrigat	tion and Virtually Impermeabl	e Films					
Project Description								
	nt Emissions using Irrigat picrin and methyl bromid	tion and Virtually Impermeabl e	e Films					
PI 1	Affiliation PI 1	Fund Source 1	Amount 1					
Husein Ajwa	UC Davis	UC Davis	\$0					
PI 2	Affiliation PI 2	Fund Source 2	Amount 2					
			\$0					
PI 3	Affiliation PI 3	Fund Source 3	Amount 3					
			\$0					
Report Location http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=185 286								
Related info 1								
Related info 2								
	iject updates and correct anning and Technical Su gov							

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Type Fumigant Emissions	Status	Completed	Estimated Completion	2007
	Mitigation			Date	
Project Name					
	Fumigant Emission	s using Irrigation	n		
Project Descr					
Evaluation of	reductions in fumiga	nt emissions us	ing tarps; focus on	1,3-D.	
PI 1	Affiliation	PI 1	Fund Source 1		Amount 1
Husein Ajwa	UC Davi		UC Davis		\$0
<u>,</u>					
PI 2	Affiliation	n PI 2	Fund Source 2		Amount 2
					\$0
PI 3	Affiliation	n PI 3	Fund Source 3		Amount 3 \$0
					ΨΟ
Report Locat	ion				
nttp://mbao.o	rg/2008/035Ajwa.pd	I			
Related info	1				
Related info	2				
Janet Spe	ovide project update encer, Planning and ⊉arb.ca.gov e717				

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 70 Project T Soil Nox Modeling	Emissions	Completed	Estimated Completion Date	May 31, 2014	
	and implementing procesion estimation, ARB conf		riculture		
	ts of companion projects mate N2O emissions for physical variables			s for	
PI 1 Changsheng Li	Affiliation PI 1 Univ New Hampshire	Fund Source 1 ARB	Amount 1 \$250,000		
PI 2 William Salas	Affiliation PI 2 Applied GeoSolutions, LLC	Fund Source 2	Fund Source 2		
기 3	Affiliation PI 3	Fund Source 3	Fund Source 3		
Report Location					
http://www.arb.ca.gov/	research/rsc/1-31-14/ite	m11dfr10-309.pdf			
Related info 1					
Related info 2					

### California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type
71	Soil Nox Emissions
	Mitigation

Status Draft Final Report

Estimated Completion Date

March 31, 2015

#### Project Name

Evaluating Mitigation Options of Nitrous Oxide Emissions in California Cropping Systems, ARB Contract No. 11-313

#### **Project Description**

Evaluate alternative management practices with greatest promise of reducing annual N2O emissions while maintaining productivity in lettuce, corn and tomatoes. Proposed strategies are: targeting fertilizer types and timing of their application, delaying nitrification by using urease and nitrification inhibitors, spatially decreasing the concentration of applied N fertilizer, and modifying irrigation methods.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2 \$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3 \$0

### Report Location

#### Related info 1

http://www.arb.ca.gov/research/single-project.php?row\_id=65096

#### Related info 2

www.arb.ca.gov/ag/fertilizer/meetings/Proposal11-313.pdf

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 72	Project Typ Tilling Emis		Status	Completed	Estimated Completion Date	Septemb	er 2011		
Project Name	<del>)</del>								
	Viable Cons	ervation Ma	nagement Pr	actice For Redu	cing PM10				
Project Desc	ription								
Quantify and substantiate PM-reducing potential of an existing DCU misting apparatus									
attached to a common agricultural disk, as well as other variables such as temperature reductionof dsut plume, emission facotrs, night farming									
PI 1		Affiliation P	l 1	Fund Source 1		Amoun	t 1		
Alex Alexand	rou	CSU Fresn		USDA-NRCS		\$210			
PI 2		Affiliation P	12	Fund Source 2		Amoun	t 2		
C. Krauter		CSU Fresn		ARI		\$420,000			
PI 3		Affiliation P	13	Fund Source 3		Amoun	t 3		
S. Ashkan		CSU Fresn					\$0		
Report Location  http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046764.pdf									
Related info 1									
Related info 2									
Please provide project undates and corrections to:									

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	pe	Status	Completed	Estimated	2010	
73	Almond Ha	arvest			Completion		
	Emissions				Date		
						<u>.                                    </u>	
Project Name							
	eeping dep	th on particu	late matter e	emissions from a	almond harvest		
operations							
Project Desc	rintion						
		weeper dept	th on particu	late matter (PM)	emissions from		
sweeping an							
PI 1		Affiliation P	YI 1	Fund Source 1		Amou	
Brock Faulkr	ner	TAMU					\$0
PI 2		Affiliation P	12	Fund Source 2		Amou	nt 2
S. Capareda		TAMU		r and Course 2		7 (1110 (1	\$0
							4.0
DI O		A (('))	N 0	E 10 0		Δ.	1.0
PI 3		Affiliation P	13	Fund Source 3		Amou	
							\$0
Report Loca	tion						
1		/ / /	n	0/4.00.40.0	0.4 16		
http://www.a	itmospoires	.com/articles	s/Volume3/is	sue2/APR-12-0	24.pdf		
Related info	) 1						
Related info	2						
Discos	rovido proi	ot undatas	and compati	ana ta:			
		ect updates a		ons to: port Division			
	@arb.ca.go		ciiiicai Sup	ווטופועום זוטע			
Japencer	warb.ca.go	V					

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 74	Project Tyl Almond Ha Emissions	arvest	Status	Completed	Estimated Completion Date	2009	
Project Nam	e						
mproving Pl	M10 Emissi	on Factors f	or Almond S	weeping and Har	vesting		
Project Desc		a and harvo	cting omicci	on factors using d	icporcion model	ling	
PI 1		Affiliation PI 1		Fund Source 1		Amount 1	
Brock Faulkner TAMU			Almond Bd of CA		\$0		
PI 2	PI 2 Affiliation F		21 2	Fund Source 2		Amo	ount 2
B. Goodrich		Trinity Con	sultants			\$0	
PI 3		Affiliation F	Y 3	Fund Source 3		Amo	ount 3
S. Capareda		TAMU					\$0
Report Loca	ition						
Proprietary,	Almond Bo	ard of CA					
Related info	o 1						
		ı/Papers/Alm	nond/Annual	Report2010.pdf			
Related info	2						

### California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 75	Project Typ Almond Ha		Status	Completed	Estimated Completion	2011	
	Emissions				Date		
Project Name	<del></del>						
		on factors f	or almond ha	arvest as a functi	on of harvester		
speed							
Project Desc	ription						
Evaluate red	uction in alm	ond harves	ting PM for r	educign harveste	er ground speed		
from 5 mph t	o 2.5 mph u	sign ISCST	3 and AERM	OD to back calc	ulate emission ra	ates	
PI 1		Affiliation P	PI 1	Fund Source 1		Amoun	t 1
Brock Faulkr	ner	TAMU					\$0
PI 2		Affiliation P	PI 2	Fund Source 2		Amoun	t 2
B. Goodrich		Trinity Con	sultants				\$0
PI 3		Affiliation P	21 3	Fund Source 3		Amoun	t 3
V. Botlagudu	ru	TAMU					\$0
Report Loca	tion						
Abstract: htt	p://www.tand	dfonline.con	n/doi/abs/10.	3155/1047-3289	.59.8.943		
Related info	1						
Related info	2						
Please n	rovide proje	ct undates a	and correction	ne to:			

Project ID	Project Type	pe	Status	Completed	Estimated	2011	
76	Almond Ha				Completion		
	Emissions				Date		
						<u> </u>	
Project Name							
Harvesting E	quipment to	Reduce PN		from Almond Hai	vest Operations	;	
Project Desc	rintion						
		n new almor	nd harvesting	g systems and ret	rofit abatement		
devices to er			ia naivooiin,	g cyclomo and rol			
conventional							
PI 1		Affiliation F	인 1	Fund Source 1		Amount 1	
Brock Faulkr	ner	TAMU		USDA-NRCS		\$0	
							]
PI 2		Affiliation F	PI 2	Fund Source 2		Amount 2	
				SJVAPCD		\$0	
PI 3		Affiliation F	01.2	Fund Source 3		Amount 3	
гіз		Allillation	13	Fulla Source 3		\$0	
						ΨΟ	
							]
Report Loca	ition						
Not available							
NOL available	G						
Related info	2 1						
ixelated lillic	J 1						
Related info	0 2						
Please p	rovide proje	ect updates	and correction	ons to:			
				port Division			
jspencer	@arb.ca.go						
916.324.	.2717						

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Pro	•	Project Type	Status	Completed		2012
	77	Soil NOx Emissions			Completion	
					Date	

#### Project Name

Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems, ARB Contract No. 08-324)

#### **Project Description**

Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 78, 79 & 81.

PI 1 William Horwath	Affiliation PI 1 UC Davis	Fund Source 1 ARB	Amount 1 \$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3 CDFA	Amount 3

## Report Location

http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf

#### Related info 1

See Project ID 62, contract 09-329, which is an add-on to study nitric acid

#### Related info 2

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 78	Project Typ Soil NOx E		Status	Completed		Estimated Completion	2013				
						Date					
	Project Name										
Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems (CEC Contract)											
Project Description  Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 79 & 81.											
PI 1		Affiliation F	PI 1	Fund Source 1			Am	ount 1			
Johan Six							\$	500,000			
PI 2		Affiliation F	12	Fund Source 2			Am	ount 2			
								\$0			
PI 3		Affiliation F	913	Fund Source 3			Am	ount 3			
								\$0			
Report Loca	tion										
http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf											
Related info	) 1										
Related info	2										

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	In Progress	Estimated	June	2013
79	Soil NOx E	missions			Completion		
					Date		
Duning t Name	_	<u> </u>					
Project Name		Nitrous Ovi	do Emission	s from California (	Cotton and Tan	noto	
Cropping Sys			de Emissions	s iroin Calilornia (	Collon and Ton	ialo	
Project Desc	ription						
		nating study	goals and me	ethods on 4 separ	ate studies to		
				izer practices for e			
				x in tomato, whea			
		falfa system	s to develop	emission factors.	See also Proje	ct	
IDs 62, 77, 7	8 & 81.						
PI 1		Affiliation P	11	Fund Source 1		Am	ount 1
Dave Gooral	200	7 timation i	···	r arra Coarco r			150,000
Dave Goorai	100					1	100,000
PI 2		Affiliation P	1 2	Fund Source 2		Δm	nount 2
112		Alliadoll I	12	T dila Godice 2		AII	\$0
							ΨΟ
PI 3		Affiliation P	13	Fund Source 3		Am	nount 3
							\$0
Report Loca	ition						
Related info	) 1						
Related info	) 2						_

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Ty	ype	atus	In Progress	Esti	imated	2015
80 Dairy Em	issions			Cor	mpletion	
Mitigation				Dat	е	

## Project Name

Quantification of the Emission Reduction Benefits of Mitigation Strategies for Dairy Silage, ARB Contract No. 11-325

#### **Project Description**

Silage emissions include criteria pollutants (e.g. VOCs, NOx) and greenhouse gases. This project aims to quantify and model the effectiveness of various mitigation practices (such as maintaining a smooth pile face, storing silage in ag bags, etc.) on the various emissions species. Factors such as silage exposure surface area, temperature, air velocity, etc. will also be measured and analyzed.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Green	UC Davis		\$0

# Report Location

#### Related info 1

Atmospheric Environment. 2010, 44:1989-1995; Atmospheric Environment. 2010, 44: 4172-4180; J. Environ. Qual. 2011, 40:1-9, Env. Sci. & Technol. 2010, 44: 2309-2314; Trans. ASABE. 2011, 53: 1-7

#### Related info 2

## California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status Complete	ed Estimated	Dec. 31, 2015
81 Soil NOx Emissions		Completion	
		Date	

## Project Name

Assessment of Baseline Nitrous Oxide Emission in Response to a Range of Nitrogen Fertilizer Application Rates in Corn Systems (CDFA Contract)

#### **Project Description**

Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 79.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	CDFA	\$92,542
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Horwath	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

## Report Location

http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/12-0453-SA113-615FRBurgerHorwath.pdf

### Related info 1

www.cdfa.ca.gov/is/docs/12-0453-SABurger.pdf

#### Related info 2

## California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Projec	ct ID	Project Type	Status	Completed	Estimated	March 2012
8:	2	Soil Nox Emissions			Completion	
		Mitigation			Date	

## Project Name

Assessing practices and influencing policy to mitigate nitrous oxide (N2O) emissions from California Agriculture

## **Project Description**

Evaluate N2O mitigation potential of nitrogen management practices and N use efficiencies in important CA cropping systems.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	Packard Foundation	\$350,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Horwath	UC Davis		\$350,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

## Report Location

Not Available

#### Related info 1

http://nitrogen.ucdavis.edu/research/nitrogen/documents

## Related info 2

http://c-agg.org/cm\_vault/files/docs/C-AGG\_Presentation-2\_29\_2012\_%28MFitzGibbon-ARB%29.pdf

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	ct Type lox Emissions ation	Status	In Progress	Estimated Completion Date	June 2013
Project Name					
Use of Walnut Bioc	har to improve soi	l properties a	and reduce N2C	emissions	
<b>Project Description</b>					
Researchers are in sequestration in a vapplied to the walnu	ariety of crops. Th	is study eval			
PI 1	Affiliation PI	1	Fund Source 1		Amount 1
Johan Six	UC Davis		CEC		\$80,834
PI 2	Affiliation PI	2	Fund Source 2		Amount 2
					\$0
PI 3	Affiliation PI	3	Fund Source 3		Amount 3
					\$0
Report Location					
Preliminary: http://v	www.plantsciences	s.ucdavis.ed	u/Agroecology/0	Outreach/Walnut	.html
Related info 1					
Related info 2					

	Project Type	Status	In Progress	Estimated	2014
84	Soil NOx Emissi	ons		Completion Date	
				Date	
Project Name	)				
	Cycle Analysis				
Project Descr	ription				
			roduction and fron	n applications of	
tinisnea comp	oost to almonds,	tomatoes and row	rcrops.		
	A CON		E 10 1		
PI 1		ation PI 1 Davis	Fund Source 1 CalRecycle		Amount 1
William Horw	ath	Javis	Carrecycle		\$450,000
PI 2	Affilia	ation PI 2	Fund Source 2		Amount 2
					\$0
PI 3	Affilia	ation PI 3	Fund Source 3		Amount 3
					\$0
Report Locat	tion				
Final draft re	port submitted A	oril 2013			
i iiiai diait io	port submitted / (	piii 2010			
Related info	1				
ivelated IIII0					
Related info	2				
		dates and correcti			
	encer, Planning a @arb.ca.gov	and Technical Sup	port Division		
916.324.2					

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID  85  Dairy En  Mitigatio	nissions	Status	Draft Proposal	Estimated Completion Date						
Project Name										
Development of Methodology to Assess Dairy Silage Management Practices to										
Reduce Emissions of Volatile Organic Compounds										
Project Description										
Develop screening methodology to assess the VOC emissions potential of silage piles. Validate the methodology with measurements at different stages from ensiling to delivery to feed lanes. Assess reductions associated with various mitigation measures.										
PI 1	Affiliation F	01.1	Fund Source 1		Δmc	ount 1				
Deeane Meyer	UC Davis	•	CDFA			219,000				
Decario Meyer					•					
PI 2	Affiliation F	12	Fund Source 2		Amo	ount 2				
Peter Robinson	UC Davis		Dairy CARES			\$0				
PI 3	Affiliation F	13	Fund Source 3		Amo	ount 3				
Jennifer Heguy	UCCE Star	nislaus				\$0				
Report Location										
Related info 1										
Related info 2										

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	roject Typ		Status	Completed		Estimated	2012	
86 D	airy Nox E	Emissions				Completion		
						Date		
							_	
Project Name	· (							
NOx emissions	from a C	entrai Califo	rnia dairy					
Project Descrip	tion							
NOx and ozone								
2011–12. Ambi								
contribution of c							ts	
were also made	e using fre	esh silage fr	om the dairy	on the Fresno	State	e campus.		
PI 1		Affiliation P	1 1	Fund Source	1		Am	ount 1
Alam Hasson		CSU Fresn		USDA AFRI			7 (111)	ount i
Alaili Hassoli		000110011		00071711111				
PI 2		Affiliation P	1 2	Fund Source	2		Λm	ount 2
Shawn Ashkan		CSU Fresh		Nat'l Science		dation	AIII	\$0
Silawii Asilkali		CSO I lesii	0	Nati Science	i ouii	dation		ΨΟ
PI 3		Affiliation P	13	Fund Source	3		Am	ount 3
Steven Trabue		Nat'l Lab fo						\$0
		Environ						·
Report Locatio	n e							
	711							
Atmos. Enviror	n. Vol. 70,	, 2013, pp 3	28-336. http:	://dx.doi.org/10	0.1016	6/j.atmosenv.2	2013.01	1.011
			·	J		•		
Related info 1								
Related info 2								
related iiilo Z								

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 87 Raisin Ha Emissions	rvest	Completed Estimated Completion Date	2013
Project Name			
Air Curtain Burner Evalu	uation		
Project Description			
		est Burn Boss Air Curtain Burner t d unit with PTO for tractor use,	to
임 1	Affiliation PI 1	Fund Source 1	Amount 1
Sun-maid Growers	Sun-Maid Growers		\$10,000
인 2	Affiliation PI 2	Fund Source 2	Amount 2
Nisei Farmers			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Kfar Equipment Co.			\$0
Report Location			
Not available			
Related info 1			_
http://www.valleyair.org	g/Workshops/postings/2 07%20Chapter%207%2	2012/12-20- 20Technology%20Advancement.p	odf
Related info 2			

# California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated	2015
88	Reducing			Completion	
	Groundwater Nitrates			Date	

## Project Name

Optimizing the Use of Groundwater Nitrogen for Nut Crops

## **Project Description**

Nitrate nitrogen research on advance grower practice using the "pump and fertilize" method in vulnerable groundwater areas for almond and pistachios. The research will evaluate whether the "pump and fertilize" method is effective in reducing use of nitrogen fertilizer based on the nitrates available in the ground water, and subsequently reduces nitrate levels in groundwater aquifers.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
David Smart	UC Davis	CDFA/FREP	\$473,000
PI 2 Patrick Brown	Affiliation PI 2 UC Davis	Fund Source 2	Amount 2 \$0
PI 3 Jan Hopmans	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3 \$0

кe	por	t Lo	cati	on

Not available

#### Related info 1

http://www.cdfa.ca.gov/is/ffldrs/frep/index.html

#### Related info 2

## California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In progress	Estimated	Sept. 2016
89	Soil Nox Emissions			Completion	
	Modeling			Date	

## Project Name

Improving DNDC Modeling Capability to Quantify Mitigation Potential of Nitrous Oxide from California Agricultural Soils

## **Project Description**

jspencer@arb.ca.gov

916.324.2717

This project will develop and deliver a modeling tool that will allow for the quantification of the emission reduction potentials from various N2O mitigation strategies that have been identified through previous ARB research. Previous studies have delivered to ARB a validated California-specific modeling tool based on DeNitrification-DeComposition (DNDC), incorporating largely business as usual management practices for baseline emission assessment. However, the model needs further

DI 4	Affiliation DI 1	Fund Course 1	Amount 1			
의 1 	Affiliation PI 1	Fund Source 1	Amount 1			
Changsheng Li	Univ New Hampshire	ARB	\$112,000			
PI 2	Affiliation PI 2	Fund Source 2	Amount 2			
William Salas	Applied GeoSolutions	Applied GeoSolutions	\$88,000			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3			
			\$0			
l						
Related info 1						
See Project ID 70						
Related info 2						
	roject updates and correcti Planning and Technical Sup					

# California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

90 Dairy	ct Type & Feedlot D Mitigation	Status Completed	Estimated Completion Date	Sept. 2014					
Project Name									
Assessment of Control Methods for PM10 Emissions from Dairy and Feedlot Corrals									
Project Description									
Particulate matter testing at four dairies and feedlots was conducted to determine emission rates and assess the efficacy of various PM10 emission control methods. The control measures tested included: no control, sprinklers, scrape and remove, modified feed time, and scrape/remove/replace.									
PI 1	Affiliation PI 1	Fund Source 1		Amount 1					
Eric Winegar	Winegar Air Sciences	CDFA		\$120,000					
PI 2	Affiliation PI 2	Fund Source 2		Amount 2					
		SJVAPSA		\$19,000					
PI 3	Affiliation PI 3	Fund Source 3		Amount 3					
				\$0					
Report Location									
https://docs.googl	https://docs.google.com/file/d/0B8uymxkFP0nwemRUZTdjejFqb2c/edit?usp=drive_web&pli=1								
Related info 1									
Related info 2									

Project ID 91	Project Typ		Status	Draft Proposal	Estimated Completion		
					Date		
Project Name	e						
Characterize	Physical ar			of Manure in Califo	ornia Dairy Syst	ems	
·		Gas (GHG) E	Emission Es	stimates			
Project Desc	ription						
I 1		Affiliation PI	1	Fund Source 1		Amount 1	
11		UC Davis	•	ARB		\$151,42	
12		Affiliation PI	2	Fund Source 2		Amount 2	
						\$	0
13		Affiliation PI	2	Fund Source 3		Amount 3	
13		Allillation Fi	3	i dila Source S			50
Report Loca	ition						
Related info							
nttp://www.a	arb.ca.gov/r	esearch/rsc/	7-08-15/jul0	8not.pdf			
Related info	0 2						
		ct updates a ning and Ted					
jspencer	@arb.ca.go		illicai Supp	DOLL DIVISION			
916.324.							

Project ID 92	Project Type GHG Emissions	Status	Draft Proposal	Estimated Completion	
				Date	
Project Name	Э				
		Cattle Feed Ration reenhouse Gas (G	ons and Improve Mo GHG) Inventory	odeling of Ente	ric
Project Desc	ription				
ય 1	Affilia	ition PI 1	Fund Source 1		Amount 1
11	UC [		ARB		\$99,964
PI 2	Affilia	tion PI 2	Fund Source 2		Amount 2
					\$0
13	Affilia	tion PI 3	Fund Source 3		Amount 3
					\$0
Report Loca	tion				
Related info	n 1				
		ch/rsc/7-08-15/jul0	8not.pdf		
Related info	2				
Janet Sp	encer, Planning a @arb.ca.gov	lates and correctio nd Technical Supp			